

1 WHAT IS CLAIMED IS:

- 1 1. A fuel additive dispensing system, comprising:
2 a housing, adapted to be affixed to a fuel dispenser having a fuel dispensing hose;
3 a hydraulic module, disposed at least partially within said housing, having a fluid input
4 adapted to be coupled to at least one source of fuel additive and a fluid output
5 flow adapted to be coupled to said fuel dispensing hose to introduce said
6 additive into a stream of fuel delivered through said fuel dispensing hose;
7 control circuitry, coupled to said hydraulic module, for generating electrical control
8 signals applied to said hydraulic module to cause a controlled amount of said
9 additive to be released from said at least one source to flow through said fluid
10 input and fluid output and into said fuel dispensing hose.
- 11
- 12 2. A fuel additive dispensing system in accordance with claim 1, wherein said controlled
13 amount of said additive is determined based upon measurements of past performance of said
14 hydraulic module.
- 15 3. A fuel additive dispensing system in accordance with claim 1, wherein said fluid input
16 comprises an input flow control manifold and said fluid output comprises an output flow control
17 manifold.
- 18 4. A fuel additive dispensing system in accordance with claim 1, wherein said hydraulic
19 module further comprises a flow meter coupled to said control circuitry for monitoring the flow of
20 additive through said hydraulic module.
- 21 5. A fuel additive dispensing system in accordance with claim 4, wherein said hydraulic
22 module operates to dispense said additive with an accuracy of at least approximately 0.75%.
- 23 6. A fuel additive dispensing system in accordance with claim 1, wherein said controlled
24 amount of additive is released in at least one increment into said stream of fuel.
- 25 7. A fuel additive dispensing system in accordance with claim 1, wherein said controlled
26 amount of additive is released each time a predetermined amount of fuel is delivered through
27 said fuel dispensing hose.
- 28 8. A fuel additive dispensing system in accordance with claim 1, further comprising a

- 1 graphic display viewable by a user of said fuel dispenser.
- 2 9. A fuel additive dispensing system in accordance with claim 8, further comprising at least
3 one user-actuable control for activating said dispensing system to dispense said fuel additive
4 into said stream of fuel.
- 5 10. A fuel additive dispensing system in accordance with claim 1, wherein said at least one
6 source of fuel additive is external to said housing.
- 7 11. A fuel additive dispensing system in accordance with claim 1, wherein said controlled
8 amount of said additive is an amount proportional to a total amount of fuel in said stream of
9 fuel.
- 10 12. A fuel additive dispensing system in accordance with claim 1, wherein said controlled
11 amount of said additive is an amount specified by a user of said fuel dispenser.
- 12 13. A fuel additive dispensing system in accordance with claim 8, further comprising a
13 proximity detector, coupled to said control circuitry, for detecting the presence of a person in the
14 vicinity of said system.
- 15 14. A fuel additive dispensing system in accordance with claim 13, wherein said proximity
16 detector applies a detection signal to said control circuitry upon detection of a person in the
17 vicinity of said system.
- 18 15. A fuel additive dispensing system in accordance with claim 14, wherein said control
19 circuitry is responsive to said detection signal to display at least one predetermined image on
20 said graphic display.
- 21 16. A fuel additive dispensing system in accordance with claim 8, wherein said graphic
22 display is responsive to said control circuitry to display a plurality of separate images thereon.
- 23 17. A fuel additive dispensing system in accordance with claim 1, further comprising a user
24 interface coupled to said control circuitry, wherein said control circuitry is responsive to a
25 selection signal generated by said control circuitry to initiate dispensation of said fuel additive.
- 26 18. A fuel additive dispensing system in accordance with claim 17, wherein said user
27 interface is responsive to user interaction to generate said selection signal.

- 1 19. A fuel additive dispensing system in accordance with claim 18, wherein said user
2 interface is responsive to said user interaction occurring prior to said stream of fuel being
3 delivered through said fuel dispensing hose to generate said selection signal.
- 4 20. A fuel additive dispensing system in accordance with claim 18, wherein said user
5 interface is responsive to said user interaction occurring while said stream of fuel is being
6 delivered through said fuel dispensing hose to generate said selection signal.
- 7 21. A method of dispensing a fuel additive, comprising:
8 (a) coupling a fluid input of a hydraulic module to a source of said additive;
9 (b) coupling a fluid output of said hydraulic module to a fuel dispensing hose;
10 (c) electrical signals to said hydraulic module to cause a controlled amount of said
11 additive to flow from said source, through said hydraulic module, and into said
12 stream of fuel flowing through said fuel dispensing hose.
- 13 22. A method in accordance with claim 21, further comprising the step of:
14 (d) obtaining measurements of performance of said hydraulic module;
15 wherein said controlled amount of said additive is determined based upon said
16 measurements of past performance of said hydraulic module.
- 17 23. A method in accordance with claim 21, wherein said fluid input comprises an input flow
18 control manifold and said fluid output comprises an output flow control manifold.
- 19 24. A method in accordance with claim 21, wherein said hydraulic module further comprises
20 a flow meter coupled to said control circuitry for monitoring the flow of additive through said
21 hydraulic module.
- 22 25. A method in accordance with claim 24, wherein said hydraulic module operates to
23 dispense said additive with an accuracy of at least approximately 0.75%.
- 24 26. A method in accordance with claim 21, wherein said controlled amount of additive is
25 released in successive increments into said stream of fuel.
- 26 27. A method in accordance with claim 21, wherein said controlled amount of additive is
27 released each time a predetermined amount of fuel is delivered through said fuel dispensing

1 · hose.

2 28. A method in accordance with claim 21, further comprising providing a graphic display
3 viewable by a user of said fuel dispenser.

4 29. A method in accordance with claim 28, further comprising providing at least one user-
5 actuatable control for activating said dispensing system to dispense said fuel additive into said
6 stream of fuel.

7 30. A method in accordance with claim 21, wherein said at least one source of fuel additive
8 is external to said housing.

9 31. A method in accordance with claim 21, wherein said controlled amount of said additive
10 is an amount proportional to a total amount of fuel in said stream of fuel.

11 32. A method in accordance with claim 21, wherein said controlled amount of said additive
12 is an amount specified by a user of said fuel dispenser.

13 33. A method in accordance with claim 28, further comprising a proximity detector, coupled
14 to said control circuitry, for detecting the presence of a person in the vicinity of said system.

15 34. A method in accordance with claim 33, wherein said proximity detector applies a
16 detection signal to said control circuitry upon detection of a person in the vicinity of said system.

17 35. A method in accordance with claim 34, wherein said control circuitry is responsive to
18 said detection signal to display at least one predetermined image on said graphic display.

19 36. A method in accordance with claim 28, wherein said graphic display is responsive to
20 said control circuitry to display a plurality of separate images thereon.

21 37. A method in accordance with claim 21, further comprising a user interface coupled to
22 said control circuitry, wherein said control circuitry is responsive to a selection signal generated
23 by said control circuitry to initiate dispensation of said fuel additive.

24 38. A method in accordance with claim 37, wherein said user interface is responsive to user
25 interaction to generate said selection signal.

1 39. A method in accordance with claim 38, wherein said user interface is responsive to said
2 user interaction occurring prior to said stream of fuel being delivered through said fuel
3 dispensing hose to generate said selection signal.

4 40. A method in accordance with claim 38, wherein said user interface is responsive to said
5 user interaction occurring while said stream of fuel is being delivered through said fuel
6 dispensing hose to generate said selection signal.

7 41. A fuel additive dispensing system in accordance with any of claims 1 through 20,
8 wherein said control circuitry is adapted to be coupled to a retail point-of-sale system including
9 a point-of-sale server for controlling a fuel dispensing transaction.

10 42. A fuel additive dispensing system in accordance with claim 41, wherein fuel and said
11 fuel additive are dispensed in a single integrated transaction.

12 43. A fuel additive dispensing system in accordance with claim 42, wherein a predetermined
13 amount of said additive is dispensed.

14 44. A fuel additive dispensing system in accordance with claim 42, wherein the amount of
15 additive dispensed is proportional to the amount of said fuel dispensed.

16 45. A fuel additive dispensing system in accordance with claim 41, wherein said control
17 circuitry is responsive to at least one signal from said retail point-of-sale system to disable said
18 fuel additive dispensing system.

19 46. A method in accordance with any of claims 21 through 40, wherein said control circuitry
20 is adapted to be coupled to a retail point-of-sale system including a point-of-sale server for
21 controlling a fuel dispensing transaction.

22 47. A method in accordance with claim 46, further comprising dispensing said fuel and said
23 fuel additive in a single integrated transaction.

24 48. A method in accordance with claim 42, further comprising dispensing a predetermined
25 amount of said additive.

26 49. A method in accordance with claim 46, further comprising dispensing an amount of
27 additive dispensed proportional to the amount of said fuel dispensed.

1 50 A fuel additive dispensing system in accordance with claim 46, wherein said control
2 circuitry is responsive to at least one signal from said retail point-of-sale system to disable said
3 fuel additive dispensing system.